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GSM Wireless Terminal
With Fax Function

WT-209

User's Manual

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1. Overview

1.1 Definitions and Abbreviations

- GSM: Global System for Mobile Communications
- FXS: Foreign Exchange Subscriber
- DTMF: Dual-Tone Multi-Frequency

1.2 Equipment Description

WT-209 GSM Wireless Terminal with Fax Function (Refer to as WT-209 in the following sections) is a device for voice and analogue fax communication. It provides wireless access functionality by GSM network. WT-209 is fit for all kinds of areas and scenarios especially in places where wired network is impossible or hard to reach.

WT-209 is a dual-board device, which one can support GSM network, another can support analogue fax.

The device provides external interfaces as below:

a) One FXS interface, connect to a telephone set
b) One SIM card slot, for SIM card installation
c) One battery slot
d) One antenna interface
e) One program interface, connect special program cable for update terminal

Figure 1-1 WT-209 GSM Wireless Terminal with Fax Function

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1.3 LED Indicators

9 Light indicators indicate running state:

Type	Label	Color	Meaning
LED	Fee	Yellow	When incoming /outgoing call begin to connect, send polarity charging signal, light on
LED	Power	Green	Light on connect to external power, light off when battery works
LED	Run	Green	Sparks - device under proper operation On or Off - device failed
LED	Hook	Green	On – telephone off hook Off – telephone on hook
LED	Battery	Red	On-battery is exhausted, need rechargeable
LED	Net	Green	Indicates connection status Off – wireless module not started Sparks quickly – network registration not completed Sparks once every 4 seconds – network registration succeeded.
LED	Signal (3 indicators)	Green	Indicates signal intensity of the network. The more the number of the lighted lamp, the stronger the signal intensity of the network Flash—standby or calling, on 1 second, off 4 seconds. It indicates faxing under fax mode.
LED	FAX	Green	Flashes means transmit fax; flash speed relate to transmit speed

1.4 Back Panel

The back panel of the equipment is shown as in Figure 1-2

Figure 1-2: Back Panel

a) Power: DC12v power supply socket.
b) Power switch: DC power switch, push down to switch on the equipment
c) Phone: RJ11 telephone set socket, connect to telephone set by normal 6P4 phone line
d) Console: Two RJ11, special cable for update terminal
e) Antenna socket: for external antenna.

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2. Functions

2.1 Main Functions

Table 2 – 1 lists the main functions of the equipment. Refer to Chapter 3 for more details.

Functions	Specification	Notes
Voice Communication	Provides one FXS interface for connecting to a telephone set, for incoming/outgoing call	
Fax	Support T3.0 Fax, Max 14400kbps，Such Max speed depends on network	
Caller ID indication	Support caller ID indication	
GSM network access	Support GSM network access	WT-209
Polarity reverse	Send polarity reverse signal for charge	
Protection	Lock SIM card, lock PIN etc.	
Keypad NMS	Network management over keypad	

Table 2-1: WT-209 Functions

2.2 Technical Specifications

a) Working Environment
   i) Operation Temperature: -10ºC ~ +55 ºC
   ii) Relative Humidity: 10% ~ 95%
   iii) Air Pressure: 86kPa ~ 106kPa
   iv) Environment noise: ≤ 60dB(A)
b) Working Frequency: GSM900/GSM1800MHz (automatically select)
c) Frequency Stability: Better than 2.5 x 10^{-6}
d) Signal Sensitivity: Less than -103dBm
e) Radiation Power: GSM <2W
f) Power Supply: AC 220 x (1 ± 15%)V
g) Caller ID Mode: DTMF
h) Telephone Line Length: No more than 1000m

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3. Operation Guide

3.1 Installation

Step 1: Insert SIM card into socket

Open the back cover, insert the SIM card, and then restore the back cover. Refer to Figure 3-1, Slide the card holder and open it by lifting it up. Insert the SIM card into the card holder. Make sure that the cut angle is on the right side and the golden connectors on the SIM card are facing downwards. Close the card holder and slide it back into its place.

NOTE: The equipment supports only 3.3V SIM Cards. Don't use any other types SIM Card

Figure 3-1: SIM Card Installation

Step 2: Connect the telephone set

Connect the telephone set and device with the telephone line by inserting the connector into the "Phone" port on the device

Step 3: Install the Antenna

Step 4: Connect the power adapter

Connect the power adapter to 220v AC power. Be sure that the AC power has been grounded. Connect the other side of power adapter to the DC Power socket in the device.

Step 5: Switch on the device

The device may be ready for use after about 15 seconds later. (The registration time may vary according to the network environment in different area)

Press "#" after finish dialed numbers, can shorten dialing time.

WARNING: Many types of telephone sets exist and they always have different electronic characteristics, so it's recommended that the telephone set keeps at least 2 meters away from the equipment so as to protect the equipment and the phone set from interfering with each other.

Outer electromagnetic rays may interface with the equipment via radiation or conduction. Some protection actions should be taken:

1) Use only single-phase 3-line alternating current power socket with the PE line installed well so that the filter circuit in the equipment works normally to filter the interference that come from the electricity network.
2) Keep the equipment out of the radio transmitters and radar transmitters with high transmission power and high frequency large current equipments.
3) Use electromagnetic shielding methods when necessary. For example use the shielded cables.
4) The cables should distribute inside the office room so as to protect the equipment from being damaged by high voltage and current caused by thunder. Distributing the cables outside is strongly discouraged.

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3.2 Swift Dial

Since GSM call is one time send number, it will send number after receive all numbers. WT-209 will treat has received all numbers and send number after stop dial 5s. Also add "＃" can treat as received numbers, and then no need wait 5s to send numbers.

3.3 Connect Fax machine

i) Connect Fax machine to WT-209 "Phone" port.
ii) During GSM network call only can use one channel (Voice/Data). So it only can support auto reply, not support manual reply.
iii) When send Fax, dial * and destination number, For example, when need fax to"87654321" fax machine, then dial "*87654321＃"（＃ is swift dial mode）. When hear fax indicating which means connecting to machine, press fax machine "start", and then can send fax. Also can use auto send mode, press "start" after hear ring-back tone.
iv) When receive fax, phone ringing, off-hook hear fax indicating tone then press "start", then to receive fax. It can also use auto reply mode.

NOTE: GSM analogue fax only support auto send-receive fax mode. It does not support manual reply

3.4 Running Status Specification

a) The power LED keeps long time on when connect to external power, OFF when use battery.
b) After powered, module initializations, RUN LED quick sparks, 0.25s on 0.25s off; finish initialization, RUN slow flash, 1 second on 1 second off, indicate device is operational.
c) When un-insert SIM card or cannot search network, NET LED flash per second, RUN quick flash; when succeeded in registering network, NET flashes per 1.5s off 0.5s on.
d) The phone indicator indicates the status of telephone connected to the device. On when off hook, off when on hook. Charge on when a call succeeds and off call terminated.
e) If wrong number or prohibited number is dialed, "Du Du" busy tone will be heard, which means the user should hang up the phone.
f) "Signal Intensity" indicator includes 3 lamps. More light on means more strong signal. Under proper 1s on 4s off, if off over 5s, then network may have problem. There should be at least 2 lamps to keep light for the device to work properly. When fax, such 3 lamps indicates fax pages, 5 pages is one showed circle as Table 3-2

Pages	**LED**		
	1	**2**	**3**
1, 6, 11	●	○	○
2, 7, 12	●	●	○
3, 8, 13	●	●	●
4, 9, 14	○	●	●
5, 10, 15	○	○	●

Table 3-2: Fax pages LED status

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3.5 Fax Test

WT-209 has pre-save 4 pages content. Under idle set fax machine as auto reply mode. Fax machine off-hook will hear dial tone, press"**91＃", hear dial tone again then on-hook. After on-hook fax machine ringing, receive incoming call"0123456789"，auto reply fax. Press"**91＃" to fax content WT-209 product profile as Table 3-3

Press	Content
**91#	WT-209 Profile
**92#	Trouble
**93#	Keypad Explanation
**94#	Version
**95#	Above total 4 pages content

Table 3-3: Test Pages Content

4. Keypad Configure Parameter

NOTICE: Keypad configures parameter set need off-hook, then on-hook and exit, parameter will auto save. Indicating tone will inform configure success or failure, if success then releases dialing tone, otherwise release busy tone.

* --begin as *, set; # -- begin as #, cancel. Followed two numbers indicate function code, function code and content or contents are separated by *
X: digital key, 0 – 9

Functions	Parameter Command	Specification
Adjust incoming call volume	##*X# X: 1 - 5	X indicates incoming call volume, from 1 to 5, 1 is lowest and 5 is highest. Password is unnecessary for setting, you will hear dialing tone if success
Adjust outgoing call volume	###X# X: 1 - 5	X indicates incoming call volume, from 1 to 5, 1 is lowest and 5 is highest. Password is unnecessary for setting, you will hear dialing tone if success

Table 4-1: Adjust Voice Volume

Functions	Parameter Command	Specification
Input parameter set password	##XXXX#	Success verify 4-digit password to enter management (parameter set)

Table 4-2: Keypad Set

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Functions	Parameter Command		Specification
	Set	Cancel	
Polarity reverse	*20#	#20#	Send polarity reverse signal for charge Set: Send Cancel: No Send (default)
PIN1	*71*PIN1#	#71*PIN1#	PIN1 Max 8-digit, no less then 4-digit
Modify PIN1	*72* old PIN1*New PIN1*New PIN1#		Before modify PIN, PIN under active status
Set default parameter	*81#		Set default parameter
Modify password	**XXXX*XXXX# (**New Password*New Password#)		Password is 4-digit. Defaulted password is "1234" before factory. Password cannot delete, only can replace old password with new password. Above only can operate after enter management (parameter set)

Table 4-3: Modify Parameter After Enter Keypad Set

5. Care and Maintenance

Operation of any radio transmitting equipment, including cellular phones, may interfere with the functionality of inadequately protected medical devices.

Keep the device dry. Precipitation, humidity and liquids contain minerals that will corrode electronic circuits. Don't drop, knock or shake the device.

TV set, telephone set, radio set, PC and other electronic equipments may cause interference with the device's performance.

Wipe the slightly device with a soft dampened cloth. Don't use harsh chemicals, cleaning solvents, or strong detergents to clean the device. Always switch off the device before cleaning.

The device may generate electromagnetic field, don't keep the device in the same place with magnetic storage media such as computer diskettes.

Don't keep the device under strong sunlight to prevent it from being too hot.

Don't attempt to connect the device with any other unauthorized devices or equipments.

Remember to follow any special regulations in force about the using of wireless telephones in any area.

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6. Battery

6.1 Battery Insert

Battery slot as **Error! Reference source not found.**. When change battery terminal shall under off state.

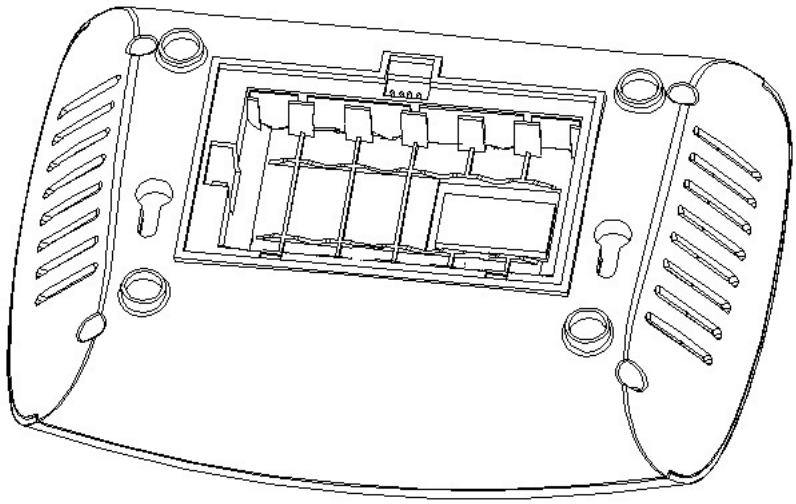

Figure 6-1: WT-209 Battery Slot

6.2 Battery Specification

WT-209 use (1.2 * 6) V Ni-hi battery

	Ni-Hi Battery (1600mAh)	**Ni-Hi Battery (2300mAh)**
Max call time	4 hours	6 hours
Max standby time	8 hours	12 hours
Duration charge to 95% capacity	Around 10 hours	Around 14 hours

1) Call/Standby time will be effected by base station signal and administrators' setting parameter. When near base, WT-209will consume less electricity.
2) Battery can recharge several hundred times, capacity will drop off. When call/standby time dropped to half time, need buy new battery.
3) WT-209 only can recharge for equipped battery.
4) Not use such battery for other application.
5) Battery will self-discharge if long time no use.
6) Battery need keep under dry and warm environment, keep in indoor condition. Li battery will greatly effected when less than 0 ºC.
7) Not make battery short-circuit. Avoid metal thing (such as coin, pin) to insert battery slot.
8) Dispose old battery shall avoid pollute environment.

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7. Troubleshooting

Problem	Solution
Failed network registering	a) Check SIM good insert b) Make sure antenna contact well, or pull antenna outside door
Power LED off	a) Make sure power supply connected to power socket correctly. b) Make sure power adapter is good, use multi-meter when necessary.
Only free call permitted	a) Make sure account balance of the SIM card is sufficient
Caller or called party hear nothing	a) Make sure phone set works properly, Ensure the connectivity of telephone line cable b) Check network
Bad voice quality	a) Signal intensity insufficient, try moving device position b) Keep the antenna long away form telephone.
Echo when talking	a) Adjust voice volume b) Network quality
No ring tone	a) Try another telephone set b) Measure the ring voltage with a multi-meter.
Cannot fax	a) Make sure such SIM Card has Fax feature b) Make sure WT-209 normal connect with fax machine

Table 7-1: Troubleshooting

Sometimes WT-209 may fail in start, RUN LED quick flash. Please refer to the following table for solution

Signal LED	Problem	Solution
○ ○ ●	Switch to Data side	Pull switch to call side
○ ● ○	Cannot detect card	Confirm SIM/UIM Card in good installation. Card slot loose or not
○ ● ●	Lock PIN	PIN locked, please unlock PIN, retry
● ○ ○	Lock PIN	PIN locked, need input PUK to unlock
● ○ ●	Lock Card	Disable lock function or change old SIM/UIM Card

Table 7-2: Failed Start

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